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AFRICAN OIL PALM IN CENTRAL AMERICA

by

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FOREWORD

Oil palms, which grow in tropical and semi-tropical climates, are an important source of vegetable oils. The oils produced from palms account for one-fifth of the estimated world output of, and make up about half of the estimated world trade in, vegetable oils. The major oils obtained from palms are coconut, palm, palm-kernel, and babassu-kernel.

The United States imports each year large quantities of oils derived from the oil palm. These include palm oil. In prewar years this country obtained large quantities of palm oil from the Netherlands East Indies (now Indonesia). Essential to the steel, tin- and terne-plate industries, palm oil has not yet given way to a satisfactory substitute. Consequently, the development of a palm oil industry in Central America is of special interest to the United States. Furthermore, such an industry eventually should enable the peoples of those countries to produce additional wealth that could earn for them much-needed foreign exchange. Thus, a palm oil industry would mean a nearby source of palm oil to the industrial countries of the Western Hemisphere and the gradual development of new export outlets in Central America.

Mr. Douglas M. Crawford, the author of this report, is Agricultural Attache at the American Embassy, Guatemala City, where he is responsible for the agricultural reporting in Guatemala, Honduras, and El Salvador. As Agricultural Attache, American Embassy, Manila, from late 1947 to late 1949, Mr. Crawford acquired first-hand knowledge of the production, processing, and sale of copra, coconut oil, and other products of the coconut palm in the Philippines. In 1946, about a year after the end of the war in the Pacific, he went to the Netherlands East Indies where, as a special representative of the United States Department of Agriculture, he spent several months studying the rehabilitation of the oil palm industry. It was important to the fat-and-oil-deficit areas of the world and to the United States that production of the Netherlands Indies oil palm plantations--which had suffered from neglect and purposeful destruction by the enemy during the occupation--be restored as rapidly as possible. Mr. Crawford gave invaluable assistance toward this end.

Personal observations, in the light of his previous experiences, and helpful cooperation from representatives of the United Fruit Company have enabled Mr. Crawford to present this timely appraisal of the African oil palm and the new palm oil industry in Central America.

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By
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In the African oil palm, Central America has a new agricultural industry. Palm oil plantings have been made in all of the Central American Republics except El Salvador. Honduras will be the first country to get into commercial production of this important fat, but Costa Rica already has one factory and a second one will be completed at the end of the year, double the size of the unit in Honduras. Plantings in Guatemala, Nicaragua, and Panama are not yet sufficiently large to warrant the construction of a large processing plant. With the type of equipment employed in Honduras, a minimum of 1,500 acres located in a central area is needed to insure adequate supplies of palm fruits for processing. The plant in Costa Rica, when completed, will be able to absorb the production from 7,000 acres.

The establishment of an African oil palm processing industry in Honduras and Costa Rica, and perhaps elsewhere at a latter date in Central America, will help to broaden the base of the agricultural economy of these countries. To date this region of the Americas has been best known as a producer and exporter of coffee and bananas. Now it has been demonstrated that an important oil crop can be grown and processed satisfactorily.

The new industry should also help provide a more balanced diet for Central Americans. Per capita fat consumption in the Republics of Central America is inordinately low. For example, in Honduras during 1949 the apparent per capita disappearance was about 9 pounds in contrast to 66 pounds in the United States. Elsewhere in Central America, per capita consumption is probably no greater. If the prices for crude palm oil can be kept at reasonable levels and the costs of finished products lowered, it is likely that per capita fat consumption in Honduras will gradually increase over the next few years.

It has been said that there is a greater concentration of potentially oil rich palms of a number of species in the Americas than in any other place in the world. However, very little has been done to utilize the fruits produced. Most of the palms are found growing in wild state and collection of the fruits in many areas is only carried on sporadically.

This observation is still true; Central America's new palm oil industry is based on commercial plantings. Most of the palm plantings to date have been made under the direction of the United Fruit Company and subsidiaries. An exception is the 200 to 300 acres of palm oil plantings that small planters have set out in Honduras. Perhaps some type of cooperative might be developed among these small planters so that installation of one or two 180-acre processing plants might prove feasible.

The areas of African oil palm plantings in Central America are as follows:

Country	Acres
Panama	953
Costa Rica	5,987
Nicaragua 1/	1,700
Honduras 2/	4,200
Guatemala 3/	1,594
Total	14,434

1/ Includes 200 acres of small planters.
2/ Includes a 1,000-acre private planting.
3/ Includes a 893-acre planting on the west coast and 701 acres on the eastern.

Most private individuals and cooperatives would not be able to finance 1,500 acres of palm oil plantings plus the equipment for a large factory. Plans are under way to design and operate small-scale factory units, however, that would process the output from 180 acres. Farm cooperatives would be in a better position to handle an installation of this size.

During June 1950 commercial production of palm oil began in Honduras at the new processing plant constructed at San Alejo by the Tela Railroad Company, a subsidiary of the United Fruit Company. The new factory and African palm oil plantings are located on the north coast of Honduras, about 9 miles from the port of Tela. A block of 3,200 acres of oil palms surround the factory; trees on 1,500 acres are now bearing. Palm fruits from a 1,000-acre private planting, located a few miles away, will be available for processing in 1953.

The output of the plant has been contracted for by a fats and oils processing factory located at La Ceiba. It is planned to utilize all of the palm oil and palm kernels for local consumption, but there may be a surplus of finished products, such as shortening and soap, which may be exported to neighboring Caribbean countries.

Experimentation with the African oil palms in Honduras began with the introduction of several varieties at the experimental garden at Lancetilla, which is situated in a valley a few miles inland from Tela. The first introductions were made in 1926 and 1927. Planting material was obtained from West Africa, Java, Sumatra, and Malaya and was tested over a period of years for adaptability and fruiting characteristics. Varities introduced from Sumatra appeared to be the most vigorous producers and the best acclimated to the north coast area. Sufficient seed material was available from the Sumatran sorts in 1942 to start

seedbeds (fig. 1). Actual field planting began in 1945 with about 1,500 acres being set out. Plantings have since been extended so that the total acreage in San Alejo is 3,200 acres, all of which will be in commercial bearing stage in 1952.

Figure 1. - A seedbed of African oil palms.

The palm oil plantings in Honduras have been made on lands which formerly produced bananas. Bananas ceased to be of economic importance due to damage caused by Panama disease. The planting site is on a relatively level coastal plain only a few feet above sea level. The soils are friable, having a fairly high sand content. The trees are planted about 48 to the acre at distances 30 feet by 30 feet. In many respects the African oil palm plantings in this area remind one of orchard crops in the United States.

Palm fruits will be available for processing during all months of the year. It is known, however, that there will be seasonal fluctuations in the amount of fruit available. It is estimated that 65 percent of the total yearly production of fruit will be harvested from July to October. During this heavy fruiting season the processing plant will operate on a 24-hour basis. After the heavy bearing season is over the plant is expected to operate on a 16-hour day until the end of December. January and February are calculated to be the months of least production and plant operations may only be on a single-shift 8-hour day.

There is a pronounced dry season in the Honduran palm oil regions. Relatively little rain falls in the months from February to May. The summer rainy season is generally light and heavy rainfall does not commence until September. Because of the long spring dry season, bananas in the north coast section of Honduras must be irrigated in order to have a sustained production. While yields of palm fruit will vary seasonally, irrigation is probably not necessary in this tree crop. Even in the season of lowest production sufficient palm fruits will be available to run the processing plant on a single-shift basis.

Figure 2. - Five-year-old oil palms with clean cultivation. Usually the spaces between rows are covered with native vegetation.

Presently, native cover vegetation is permitted to grow between the rows of palms trees and will be cut back to permit easy access in harvesting fruits (fig. 2). Fertilizer and cover crop trials are under way to determine their degree of usefulness. Even without the use of applied fertilizers the young 4- and 5-year-old palm trees appear to be vigorous growers and many were fruiting heavily.

In some palms, fruiting begins as early as 3 years, but it is more general during the fourth year (fig. 3). Commercial bearing stage is reached during the fifth year when bunches of fruit weighing about 35

Figure 3. - An oil palm about 4 years old, showing development of the first bunches of fruit.

Figure 4. - A typical bunch of palm fruit harvested from a 5-year-old tree. The bunch weighs about 35 pounds.

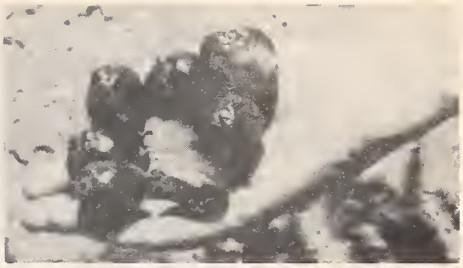

Figure 6. - Comparative size of individual palm fruits.

pounds are available for harvest (figs. 4, 5, 6). Full production may be reached during the seventh and eighth year, at which time the weight of individual palm bunches is expected to be around 75 to 80 pounds.

Since none of the plantings has reached full bearing state, it is only possible to make statements about the potential oil yield of the Honduran plantings. Care has been exercised in the selection of planting material as well as in the cultural practices. It is hoped that yields

Figure 5. - Mature bunches of palm fruit on a 5-year-old palm.

may approach those of the better plantings of Sumatra and Malaya. If this goal is reached, then it is reasonable to expect that the yearly yield will average about 2,500 pounds per acre. The yield of palm kernels may approach 600 pounds an acre under favorable conditions.

Compared with other commercially important oils of vegetable origins, unit yields of palm oil far surpass all others. Under favorable growing conditions, 2,500 pounds per acre of palm oil can be produced yearly. Contrast this figure with 1,200 to 1,500 pounds of coconut oil derived from processing the coconut. Yields of Temperate Zone oil seeds are considerably lower: About 70 to 75 pounds of cottonseed oil can be obtained on the acre basis while soybeans yield about 170 pounds of oil. Per acre yields of peanut oil are somewhat higher, averaging 215 to 220 pounds.

When mature, most of the palm fruits were black at the rounded end of the fruits. The central portion of the fruit was orange in color and gradually changed to a yellow at the apex end.

It will be recalled that two types of oil are obtained from the palm, Elaeis Guineensis, which is native to the tropical areas of West Africa. Palm oil is derived from the pulpy fibrous covering of the nut. When extracted, this oil ranges in color from orange to deep red--the coloring primarily resulting from the presence of carotene. When the palm fruits are not held for a long period before processing, the resulting oil has a consistency of soft butter at room temperatures. When poorly extracted from fruits that have been picked for a number of days, the consistency of the oil is that of tallow because of the higher free fatty acid content. Since palm oil is not in liquid state at usual daily temperatures, it must be heated to approximately 120° F. before transfer into tanks or drums.

Palm kernel oil is the second oil derived from the fruits. In comparison the kernel oil is similar to coconut oil, having a high lauric acid content that makes it desirable for use in the soap kettle. In the selection trials and breeding work of African oil palm, one of the main thoughts has been to increase the amount of pulp or palm oil in relation to kernel oil. Hence in Honduras where selected varieties are planted, proportionately more palm oil is derived per fruit than is true with the wild palms of West Africa.

In Honduras it is believed that about 25 percent of the individual fruits consist of palm oil while 6 percent of the total weight is the kernel. About two-thirds of the weight of the bunch consists of palm fruit, the balance being stem and branch material.

Palm fruits will be brought to the factory for processing by means of tractor-drawn trailers or trucks (fig. 7). The trailers may have two large roller-equipped baskets that may be filled in the field with palm fruit (fig. 8). After the baskets are filled, the trailer will be brought to

Figure 7. - Palm fruit ready to be hauled to the processing plant.

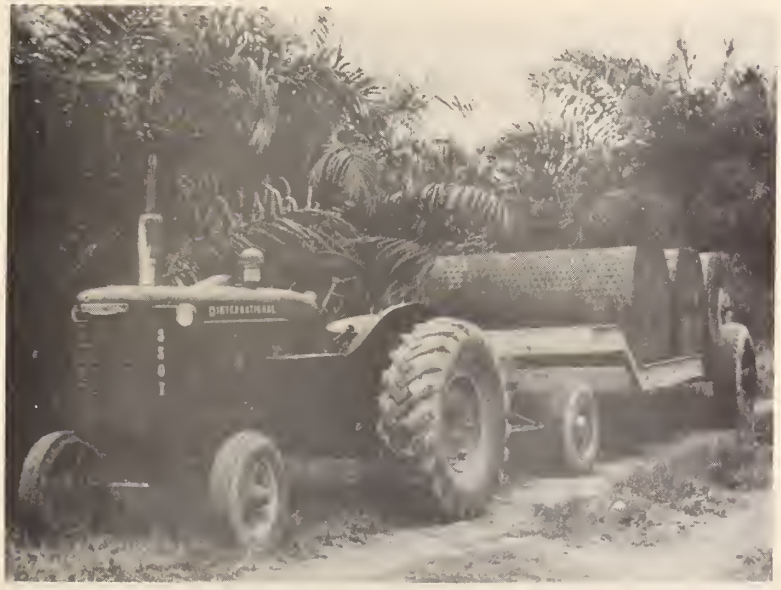

Figure 8. - After cutting, bunches of fruit are dumped into the perforated steel baskets and taken to the processing plant. These same roller-equipped baskets are unloaded by crane and shoved into the sterilizing chambers.

the factory side and the steel baskets unloaded by means of a moving crane. The roller-equipped baskets will be placed on rails and pushed into a sterilized chamber where fruits will be steamed for about an hour.

After the steam treatment the bunches of fruits are run through a machine that separates the palm fruits from the stems. The steamed fruits are conveyed upward into a centrifuge. The centrifuge consists of a perforated metal basket fitted into a steam chamber. It is rotated at a great speed to remove the palm oil from the pulpy fibrous material surrounding the nut.

It is believed that about 95 percent of the pulp or palm oil will be extracted by the centrifuge. The palm nuts with the fibrous outer material are moved into another machine which separates the fiber from the nuts. The nuts then pass into a heating chamber where they are held for sufficient time to shrink the kernel from the sides of the shell.

The next step is to crack the nuts and separate the shells from the kernels. Separation takes place by dropping the broken shells and kernels over a raised steel carpet that catches and holds the irregular pieces of shells but allows the smooth oval shaped kernels to run off. Because the kernels are shrunk sufficiently from the side of the shell, most of them are processed without breakage and are in a single piece.

The processing plant, which can handle 6 tons of bunches an hour, was designed and built in England (fig. 9). It is similar to those that operate in Malaya with the possible exception that the plant has been designed to operate on a straight production line basis rather than having the equipment staggered at various places through the factory. Presently, only one side of the plant has processing equipment; the other has been reserved for an additional line of processing equipment should an expansion program be undertaken.

Fuel requirements for the boilers of the factory will be taken care of by the shells and fibrous pericarp material that remains after processing. It is believed that no additional fuel supplies will be required.

Figure 9. - The palm oil processing plant at San Alejo, Honduras.

Samples taken of the first runs of palm oil indicate that the free acid content can be kept down to 2 percent or less. Care will be taken that most of the palm bunches will be processed within 24 hours after cutting to help keep the fatty acid content as low as possible. The samples of the oil seen were of a light red color and were of a buttery consistency except for a small percentage of the lighter fractions of liquid oil at the top of the test bottle.